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SOME OF THE  
HINDRANCES AND HELPS  
TO THE  
ADVANCEMENT OF AGRICULTURE.

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AN ADDRESS BEFORE THE  
*P* New York State Agricultural Society,

AT THE TWENTY-NINTH ANNUAL FAIR, AT ELMIRA, 1869,


BY  
GEORGE BUCKLAND,

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OF ONTARIO.

PUBLISHED BY THE SOCIETY.

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ALBANY:  
CHARLES VAN BENTHUYSEN & SONS' PRINT.  
1869.







# ADDRESS.

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*Mr. President, and Members of the  
New York State Agricultural Society :*

GENTLEMEN :

I esteem very highly the honor you have done me, by inviting me to deliver the Address usually given on the anniversary occasions of your extensive, instructive and world-renowned exhibitions. I have always been accustomed to regard your Society with feelings of respect and gratitude, as being the precursor of many similar institutions on this wide and fertile Continent; and I shall esteem the present occasion of addressing the farmers, mechanics, and citizens generally, of the old Empire State, among the happiest of my life, if I can say anything that shall, in however humble a degree, tend to encourage you in prosecuting the important objects contemplated by the founders of this Society more than a quarter of a century ago.

Orators and poets of all ages and countries have extolled the importance of Agriculture, and sung of the charms and beauties of rural life. As the first want of man is food, and the only supply being the produce of the soil, the cultivation of the earth and the keeping of flocks and herds must have been coëval with the first fixed forms of human society, and the history of this necessary art may be justly regarded as the history of civilization itself. Not only do we depend on the skill and industry of the husbandman for the staff of life,—“our daily bread,”—but also, in a great measure, for the raw material, as it is termed, which the manufacturing and ornamental arts of an ever-advancing civilization work up into the necessities and adornments of social and domestic life.

If, therefore, agriculture be so ancient and indispensable, not only to the general well-being of society, but to the very physical existence of man, removed but a degree from the savage state, the question naturally arises in every reflective mind, acquainted with its general or particular history, How is it that this most valuable art has not kept pace with the other industries of life, but has generally been found lagging behind, and frequently exhibiting symptoms of a feeble and

sickly existence? There have been laws and customs in most of the countries of the old world, affecting the acquisition, distribution, and management of landed property, that have done much, and unhappily in some cases yet continue, to impede the progress of a national agriculture; causes from which we, of the new world, are in great measure, or altogether, free. But the question naturally occurs, whether, under favorable circumstances, there is anything in the nature of agricultural pursuits, *per se*, that tends to render its improvement and progress comparatively slow? I think there is.

In the first place, in countries of the temperate zone, at least, it requires a whole year for the farmer to make a single experiment, and, as the art advances, much longer periods, as rotations of four, seven, or more years are involved, before safe conclusions can be drawn from well established data. If to this be added the differences of soil, even on the same farm, the variable character of the seasons, and the many substances now employed as manures, it will be at once apparent that agricultural experiments are, in their very nature, highly complicated, and the number that comes within the experience of the busiest and longest life, must be necessarily

restricted. In most other industrial arts, experiments may be almost indefinitely multiplied within ordinary limits of time, and subjected to a series of rigid corrections, so that reliable results may, in most cases, be readily obtained.

Again: The isolated character of the farmer's life must necessarily tend, in some measure, to retard the progress of his art, as compared with those carried on in the populous centres of human industry. In cities and towns, merchants and manufacturers come in daily contact with one another; inquiry hence becomes stimulated, information rapidly and widely diffused, experiences compared; and whatever may occur to affect the interests of any particular branch of industry, those who pursue it can meet without delay, and take counsel in regard to their common welfare. Farmers, from the nature of their pursuits, even in this wonderful age of cheap and rapid intercommunication, are necessarily cut off, more or less, from each other, and can only come together at infrequent intervals. It is noteworthy to remark how comparatively rapid has been improvement in agriculture, both in the old world and the new, since the general introduction of the railway, which, with other agencies, has been a chief means of quickening the agricultural mind,

not merely by cheapening transit, and in some instances creating new markets, but chiefly by enabling the tillers of the soil to extend the sphere of their observations, of witnessing and comparing different systems of culture, and of obtaining valuable information of a reliable character from each other's observations and different modes of practice. I can remember the time when large numbers of English farmers seldom went beyond the boundary of their own county; some even hardly passed the limits of their own or adjoining parish. What a change has been effected since the introduction of the railway! Farmers may now be seen traveling hundreds of miles to an Exhibition, or in company as members of a Club, paying periodic visits to inspect the practices of distinguished individuals of their craft in different parts of the country. A little perambulating of this sort has a most salutary effect in enlarging the farmer's circle of observation, enabling him to gain new ideas, to break loose from traditional prejudices, and to improve his practice by adapting it to the new lights which science and enlarged experience throw across his path.

Among the causes that have retarded the progress of husbandry may be mentioned the absence

of a healthy and efficient agricultural literature. It is true, that a number of treatises on this ancient and indispensable art were written by distinguished men belonging to the two most cultivated nations of antiquity—the Greeks and the Romans—and in such of their works or fragments as have come down to us, we find interspersed not a little that is excellent and practical, from which we might profit in the present day. These writings, however, and even those of a much later date, contain, as Lord Bacon said, “*no principles*;” that is, they are, notwithstanding the many valuable and practical directions which they contain, essentially empirical. Indeed, it could not possibly have been otherwise, as agriculture was incapable of being reduced to anything approaching the condition of a science, till chemistry and physiology, at least, assumed a definite form; a result that may be said to be quite recent. Going back to the early part of the present century, when Sir Humphrey Davy delivered his celebrated lectures on agricultural chemistry to the Board of Agriculture in England, and to the report of Baron Liebig, on the same subject, to the British Association for the Advancement of Science, some thirty years ago, we discover the cause of the mighty impulse that has in these



days been given to more earnest scientific research, and wider and deeper investigations, so as to put not only the laboratory, but also the printing press into a more active and harmonious operation. In all civilized countries science, of late, has more or less been brought to bear on the practice of agriculture with beneficial results, and the Reports and Transactions of Agricultural Societies in different parts of the world, together with a legion of periodical journals in this great interest, unmistakably indicate the present healthy state of progress, the future limits of which it is quite impossible to define. I may further observe, that America occupies a foremost place in agricultural literature, as the valuable Reports and Transactions of this and other Societies, with the documents that are annually issued by the Federal and State governments, amply testify. Your numerous weekly and monthly periodicals, embracing such pursuits, works mostly, I believe, of private enterprise, estimated by their price, quality and circulation, stand unquestionably ahead of any other similar publications in the world. And here I shall be only doing a simple act of justice by making a passing reference to the last Report published by your Society. The "getting up," as it is tech-

nically termed; its numerous and beautifully executed illustrations; the scientific and practical papers on some of the most important and difficult subjects that come within the range of modern research, brought down to the present state of knowledge, would be an honor to any Society, older and wealthier than your own. Instead, then, of croaking and finding fault on account of the slow progress of our art, instances such as these should inspire us with glowing hopes for the future.

It has been remarked that, as a general rule, whatever is most valuable and enduring is of slow and progressive development. The globe we live on—at least its crust—appears to have been subjected to physical changes through untold and even unimagined periods of duration. Its vegetable productions, the trees of our own forests, for instance,—some will endure for centuries ere they become finally resolved into the mineral and organic constituents of which they are composed. Our Christian civilization has a most interesting and instructive history to tell; its numerous vicissitudes, sometimes apparently stationary and even retrograding, at others marked by decided if not rapid progress; and yet it has taken nearly nineteen centuries to reach its pre-

sent imperfect condition. So, again, as regards civil government. What time, talent, statesmanship and philanthropy have been expended in reducing to a practical form the best way of ruling mankind, so as to obtain the legitimate object of all sound legislation, “the greatest happiness of the greatest number.” In these matters our knowledge has to be corrected and enlarged by time and experience; and notwithstanding the progress, particularly of late, that has marked the history of many nations, who has the temerity to affirm of any one of them, that it has reached the *ne plus ultra* of perfection? So it may be that the slow advance of agriculture during the past centuries is in accordance with a principle of nature, of a much wider application than is generally perceived.

Whatever causes may have contributed to impede the onward march of agriculture, some more difficult to modify or remove than others, I have long felt a strong conviction that the most formidable obstacle to the general advancement of the art in all ages and countries has been, and unfortunately still is, the low estimation in which it is held, not only by communities, but also by the great mass of its followers themselves;—by this I mean, the little acquisition of an intellectual

character which has been regarded necessary to a farmer. I believe, and rejoice in the conviction, that a new era is commencing, or rather has already commenced in earnestness, in several countries of the Eastern hemisphere, and that to us here of the West, especially, a high and important trust has been committed, which, if faithfully executed, will be pregnant with untold blessings to all coming generations. To thoughtful minds the truth is beginning everywhere to be more or less distinctly recognized, that it is not every man can, by the old routine of mere muscular toil, be made a prosperous and improving farmer, but that a good general education in the first place, supplemented by special study and training, with the acquisition of sound business habits, are the essential elements of success. The fact is, that farming, intelligently pursued, is quite as much an affair of the mind as of the body. Indeed, muscular force, as is well known in all other matters, spends itself for naught when not directed by mental power; and most assuredly the practice of husbandry is no exception to this great, general law; and he who successfully labors to base the art of culture on the facts and principles of science, dissipates the darkness and uncertainties of empiricism, and becomes, in the

highest sense, the improver and benefactor of his race. Let us look at this matter for a few minutes in a familiar manner. Let us ask ourselves the question, *What is Agriculture?* and try to answer it as briefly and accurately as we can. Agriculture, it may be said, is the art of cultivating the soil for raising crops for the sustentation of man and animals. Now, who that reflects on what is involved in this short answer, can come to the conclusion that any man, provided he has powerful muscles, can make a farmer?

The first thing that might strike the attention of a reflecting person, in the above definition, is the little word "*soil*;" a term expressing not a simple, but an extremely complicated substance, comprising a variety of materials, in different chemical and mechanical conditions. In travelling through any considerable area of country, you pass over a diversified surface, composed of different soils, from the disintegration and commingling of the various underlying rocks, differing in some instances very widely from each other in chemical composition, and mechanical and hygrometric properties. To acquire what may be termed only a practical knowledge of soils, a life of observation and farm-experience is required; and if we desire a minute and accurate

acquaintance with particulars, on which much of success or loss in practice may depend, we are compelled to invoke the aid of the chemist and the geologist. The soil is a very complex thing, susceptible at the hands of man of great improvement, or, as is unhappily sometimes the case, of great deterioration; and no cultivator, however advanced his practice, or minute and extensive his observation, can obtain the maximum of profit and sustain the fertility of his land, without an acquaintance with those facts and laws, in relation thereto, which science has investigated and can alone explain.

Again: The soil, air, and water contain all the constituents which the farmer by means of *cultivation* elaborates into crops, and it is from the former alone that they obtain their mineral or inorganic portion. Now mark what is implied by this single word, *cultivation*. It involves, of course, the use of tools, implements and machines, the efficiency of which mainly depends on their mechanical adaptation to the various kinds of soils, as regards texture, density, and relation to warmth and moisture, and also to the habits and special requirements of different crops. In addressing an American audience, a people so distinguished for fertility of invention,



I need only say, that between implements and machines constructed on the most approved principles of modern mechanics, and successful and profitable farming, there is an intimate and indissoluble connection. Take only that important and primitive symbol of husbandry, the plough, and without going back to Egypt, or the ancient Romans; compare, or rather contrast the implements that were in general use in Europe and on this Continent less than fifty years ago, with those of the present time, and you perceive at once how much depends upon the employment of such implements as are in their form and construction in accordance with the laws and well-ascertained formulas of mechanical philosophy.

Further: The farmer cultivates the soil for the exclusive purpose, in the first instance, of raising crops; in other words, such vegetable productions as are best suited to soil, climate and markets. He ascends from the dead mineral earth to the living organized plant. A tiny seed is deposited in the earth, and under the influence of warmth and moisture germinates, assimilating materials from both the air and soil in the progress of growth, and after passing through a wonderful cycle of changes, reaches the condition of a perfect plant, ripens its seed, and thus secures

the perpetuity of its species. Here he is brought directly in connection with the higher teachings of Chemistry and Vegetable Physiology.

The farmer has yet a further and higher object: he raises plants for the sustentation of animals. This is the great and ultimate end of all agricultural operations. What a beautiful view is here opened by the ordinary routine of the farmer's daily life, of the intimate connection between what are termed the three great kingdoms of Nature! The animal could not exist without the vegetable, which in its turn depends upon the mineral. Thus he ascends from the dead earth to the living plant, on which is nourished the living, moving and sentient animal! In the breeding, feeding and general management of his stock, the manner in which these operations are conducted may be regarded as an unerring index of the state and progress of agriculture; and much of the success of the practical man will depend on the extent and correctness of his knowledge of the principles of Zoölogy and Animal Physiology.

Now, will it be maintained that agriculture is so simple a thing that any youth, however feeble his mind and sluggish his mental habits, can readily be made into a farmer, and that to engage

in this pursuit, but little special information or training is needed, but simply a large expenditure of muscular force in accordance with a certain time-honored routine? This, unhappily, has been the prevalent feeling of the past, and it is still too much so at present; and I repeat, that it is to this low and fallacious estimate of the nature of agriculture and the qualifications of its pursuers, that much of its complained-of slow progress is attributable. We must rouse ourselves so as to take higher and wider views of this great art, which, instead of being the simplest, is one of the most difficult and complex, as it is unquestionably the most valuable, of the various industries of this brief and busy life.

I am aware that many fallacies have been committed by persons of sanguine temperament, earnestly desirous of correcting this low and degrading estimate of agricultural pursuits, by too strictly comparing its actual progress with that of some other arts. In order that comparisons may not be invidious, it is necessary they should be correct. It should be borne in mind that the marvelous progress made during the present century, in the cheapness and increased productions of textile manufactures, bleaching, dyeing, calico printing, etc., is in great measure

due to the application of inorganic chemistry and improved machinery ; the former science having attained to extraordinary development and exactitude during the past fifty years. The aid which chemistry renders the farmer, relates chiefly to the nutrition and growth of vegetable and animal life, termed organic, a department of the science having as yet but a very brief history, and the pursuit of which is beset with many and peculiar difficulties, and is subjected to rapid changes as in the progress of discovery, past errors become corrected and new truths established. The manufacturer, by availing himself of the certain aids of a more simple and advanced department of chemistry, and operating exclusively on dead matter, under well-defined physical conditions of temperature, light, moisture, etc., is placed in a position almost absolutely to command whatever results may be desired. How different is it in these respects with the farmer, whose operations are exposed to and influenced by the uncertainty and variations of the weather, the changes in the nature of soils, often within very limited areas, and the complicated workings of that wonderful and mysterious force denominated *life* ! In view, then, of these simple facts of the case, it would obviously be unreasonable, even under the most

favorable conditions, to expect agriculture to advance with the rapid speed that has of late years characterized several of the manufacturing arts. The apparent anomaly, however, only strengthens and illustrates what I am desirous of impressing on this large and intelligent audience,—the necessity and advantage of *connecting practice with science*. The principles of the latter are as applicable to the farm as they are to the manufactory, and the many and peculiar difficulties which at present beset the pursuits of farmers in relation to the higher teachings and applications of science, should induce them more earnestly than ever to devote their lives to inquiry, patient observation and unfaltering perseverance, welcoming with gratitude every ray of light which science may throw across their path, in the full assurance that, by degrees, present anomalies and perplexities of practice will be explained, and this noble art removed in great measure, if not entirely, out of the dark recesses of empiricism, into the cheering and health-inspiring light of a progressive science.

Having thus spoken of the connection between science and agriculture, and of the valuable aid the former has of late years rendered the latter, with a prospect of still greater benefits in time

to come, I wish to guard myself against being understood as countenancing the erroneous and impracticable idea that an intelligent and improving farmer must, in the *professional* sense of the term, be "a man of science." Such an opinion this audience need not to be told is quite utopian. The progress of the natural and experimental sciences of the present day is so marvelously great that it requires the energies of a life to keep pace with almost any one of them. If youths, intended for farming, as a means of obtaining a livelihood, were placed in the laboratory to acquire and master the very delicate art of manipulation in the higher branches of organic analysis, with a view of becoming accomplished chemists, the time occupied in such studies and pursuits must preclude them from acquiring that practical knowledge and those business habits, apart from which farming must, commercially at least, prove a disastrous failure. What is really needed, and what is, I think, practicable, is so to instruct our youth in the principles of science, as to enable them to appreciate the results obtained by scientific men, and advantageously co-operate with them in effecting practical improvements. The amount of scientific knowledge which such a view assumes is no



contemptible modicum, and would demand years of patient study and careful observation of an active business life to acquire. The great question is, how, in the present state of society and its educational appliances, a knowledge of scientific and practical agriculture can be best obtained?

It has often occurred to me that in this, as in most other matters, the best plan is to begin at the beginning, by imparting a knowledge to the pupils of common country schools of the foundation principles of good husbandry. The extent of the information that could thus be given would necessarily be restricted, but it need not on that account be otherwise than sound and practical. We have already several little text-books suited for such a purpose, and teachers without the expenditure of much time and money, might prepare themselves for the work, which would certainly tend to raise their professional status in the country, by increasing their respect and usefulness. The matter contained in *Johnston's Catechism of Agricultural Chemistry and Geology*, and *Stephens' Catechism of Practical Agriculture*, modified and adapted to American wants, would, if carefully gone through in a country school, impart a considerable amount of sound and use-

ful instruction, and lay a firm foundation for whatever subsequent additions the pupils might acquire to erect thereon. It would be a pleasing and instructive object to have country schools provided with gardens for experimental and illustrative purposes. Such adjuncts would form valuable auxiliaries of teaching, and also tend to refine the taste and enlarge the minds of the pupils. A school house, instead of being, as is even yet too much the case in old and wealthy districts, bald and uninviting in appearance, if not positively repulsive, should be expressive and in harmony with its primary objects, both in its exterior and interior features, and a little ornamental planting and fencing would, as in the cases of churches and other buildings, public and private, very much improve the landscape of the country and add a new charm to rural life.

Agricultural Colleges have, of late years, attracted no inconsiderable amount of attention, both in Europe and America, and a number of experiments have been made with very varying degrees of success. The immense grants of the public lands made a few years ago by the Federal government for the establishment of agricultural colleges, and the prompt action taken by many of the State Legislatures to reduce the noble pro-

ject to practice, redound to the honor and intelligence of this great nation. An old and distinguished member of this Society has immortalized his name, and done imperishable honor to his country by the princely munificence which founded the *Cornell University*, in this State; an institution which recognizes the true dignity of human labor, both of the mind and of the hands, and strives in a natural and beneficent manner to combine both in harmonious relation. Every true friend of his country and race must earnestly desire that this and similar institutions may realize the aspirations of their founders and promoters, and impart untold blessings to posterity.

It would be impracticable to lay down, in all cases, absolute rules for teaching agriculture, theoretical or practical, in public institutions, as much must depend on the varying circumstances of each country or State. If elementary instruction were generally given in primary schools on the leading principles of this art, a desire, no doubt, would be increased, in many instances, for more extensive and minute information, which the higher order of colleges only could impart. When it is found impracticable to establish and sustain a pure and independent agricultural college, the object might, to a great extent, be

accomplished by incorporating an Agricultural Department with already existing educational institutions, possessing a staff of teachers in the various branches usually comprised in a University course of instruction. A farm of more or less extent for experimental and illustrative purposes would seem to be a necessary appendage, where the teaching of the class room might receive a practical exemplification in the field or the garden. And here I may observe that agriculture, or the other industrial arts, cannot be thoroughly learnt in colleges or schools however well adapted they may be for teaching their scientific principles; the farm and the workshop are the only places where a practical knowledge, constituting an accomplished workman, can be obtained. It is most desirable that youths, intended for agriculture as a pursuit, should be regularly trained to farm labor, and in all young countries especially, such a condition is a necessity. Work, both of the head and hands, constitutes the basis of every sound system of agricultural education. And after all, perhaps, to make a thorough and accomplished agriculturist, one whose acquirements will enable him to extend the bounds of knowledge, and enable him to adapt himself to the varying circumstances and condi-

tions of practical life, he must study in more than one school, and become familiar with more than one system of instruction. The facts and laws of science he can learn in the college, and observe their application to practice on the experimental grounds; but he will further require a wider circle of observation only to be acquired by travel, and thus make himself personally acquainted with the different systems of management pursued by distinguished cultivators and breeders in various localities or countries.

Among the most efficient means of advancing the agricultural and cognate arts, I feel no hesitation in placing Societies, such as the one whose annual exhibition many thousands will have witnessed on these grounds during the present week. Happily, Societies of this nature have been formed in most civilized countries, and their success, upon the whole, must be considered decidedly encouraging. Numbers, no doubt, attend on these occasions for mere holiday pleasure, and probably carry away but little information that will benefit either themselves or others. It is to be regretted that the great essential objects and functions of these shows are not more clearly and generally understood, and their teaching-power more deeply and widely felt. To see and

to observe are too frequently very different things. It is the facilities given to observation, comparing one thing with another, and the drawing of sound practical conclusions from a sufficient number of well-observed facts, that give to occasions like this their principal means of usefulness. The management of these shows, as they increase in size and complexity, requires continued modification, and is yet susceptible in all instances of improvement. I observe that you have adopted the plan of entering articles some weeks previous to the holding of the show, a practice which we in Canada (Ontario) have pursued with much satisfaction for several years. Now, we have only to take a step or two further; so to limit the period for taking entries, and make it *absolute*, that sufficient time may be afforded for compiling a complete classified catalogue or catalogues, and providing in the show-yard and its buildings, "a place for every thing, and have everything in its place." To this state of advancement most of the great National Societies of Europe have already brought their exhibitions, and we on this side of the Atlantic would greatly consult the convenience and information of visitors, and materially enhance the interest and increase the usefulness of our exhibitions by fol-



lowing, as close and rapidly as circumstances admit, so good an example. The management of the Royal English Society's show, last year, at Leicester—the ease and harmony of its working—was to me a marvelous phenomenon. The grand secret of all this consists simply in the final closing of all entries in proper time to allow of the necessary arrangements for the placing of the articles in an orderly and systematic manner. Further: It has appeared to me that a longer time than is ordinarily given is required to bring fully out the teaching-power of our exhibitions. Live stock probably could not be kept longer than it usually is, without incurring an amount of inconvenience, risk and expense that might discourage exhibitors. But, as regards mechanical, manufacturing and fine arts productions, and those of the farm and garden, that is, with the exception only of animals, the same reasons do not apply, or, at least, only in a very inferior degree, while the addition of only one or two days to the very contracted time usually allotted the public to observe these departments, would be both welcome and advantageous to all visitors. I have often thought that we go to enormous trouble and expense to get great crowds together for a day or two, in which it is always difficult, and

sometimes impossible, for individuals desirous of obtaining information, to inspect the articles with any degree of care or comfort. The suggestion which I have ventured to make would, to a considerable extent, at least, rectify this serious defect.

It has often occurred to me that there is a latent power of good in local agricultural societies that would be of great public benefit, if it were properly developed. I refer to the advantages that would follow the more frequent meeting of their members, for the consideration and discussion of subjects of a practical or scientific character. Members of the majority of township societies are commonly satisfied, I believe, with an annual fair, and meeting for the yearly transaction of business and election of officers. Exhibitions are very useful and excellent things, but they are not everything. An agricultural society should be, in the strict sense of the words, "*a mutual improvement society.*" This valuable object is, no doubt, largely obtained by bringing the results of industry before public attention, for inspection and competition. Such occasions awaken thought and interest, inspire men with higher aims, and more powerful motives to improvement. Periodical meetings during the re-

mainder of the year, especially the comparatively leisure season to farmers—the winter—would more effectually sustain and direct these impulses into fresh and practical channels. In this way the alleged sluggishness of the agricultural mind would be quickened, practical men would compare notes, and each would inspire and improve the other by the mutual interchange of thought and the teachings of experience. Thus the foundations of agricultural knowledge would become broader and deeper, popular fallacies corrected, a pleasing social interest strengthened, a taste for reading and observation elicited, and the proffered aids of science with increased earnestness invoked. I am not aware to what extent “Farmers’ Clubs,” as they are termed, exist in this country;—the one in the city of New York has for many years had a wide reputation; and I have felt much pleasure and derived considerable profit from reading the reports of meetings for discussion during the exhibition-week of your Society, and also of its winter-meetings in Albany. If the smaller societies in the country would generally follow out this principle, a fresh and most salutary impulse would be given to agriculture, and young men engaged in the pursuit would take a greater and more rational interest in its

advancement, and better prepare themselves for the discharge of the public duties of life. Referring to young men—how is it that so many abandon the rural pursuits of their fathers, and rush into cities and towns, to intensify the already severe competition generally existing in commerce and the professions?

There are doubtless several causes which conspire to produce this social phenomenon; the principal I believe to be, what has already been referred to—the false and low estimate commonly put upon farming as a pursuit. It is yet too much regarded as a monotonous life of drudgery, naturally inferior in social status to the more dazzling occupations of city life, and utterly powerless as a means of acquiring a fortune. Young men of ardent imaginations and undisciplined minds soon become dissatisfied with what to them is one dull and dreary round of duty. How little is done in many country homes, to make them attractive to the young, and often still less on the farm, to render its various seasonal operations a source of rational interest and agreeable information! Give to youth such an education and training as will enable them to comprehend and appreciate the wonderful phenomena of their daily life, and they will soon feel convinced that

agriculture is an intellectual, agreeable and dignified pursuit, alike favorable to health of body, and strength and purity of mind. Practical farming of course implies a certain amount of manual labor, but this, within proper bounds, is a blessing, rather than a curse. Everybody knows that physical exertion of some kind or other is an essential condition of bodily health; and the farmer has the pleasure and advantage of laboring in a salubrious atmosphere, under the blue vault of heaven, surrounded by the beauty and charms of country scenery. Besides, if the farmer has at particular times to work hard through many a long day, we must not suppose that city life is one of peculiar ease. It is, probably, on the whole, a harder life than that of the country. Men, as a rule, do not make fortunes in trade, or rise to eminence and opulence in the professions, without powerful and continuous exertions of the mind, and sometimes, too, of the body. Multitudes in every large city labor hard day by day, for little more than a bare subsistence, enjoying but few intellectual resources, or the amenities of social life. In a country like yours, where class distinctions are not sharply drawn, and honest labor in any department of industry need not be ashamed to raise its head,

what a pity it is to see the youth from the country, the strength and hope of the State, flocking into the cities to intensify, as I have already said, the competition that even now is, in many cases, overdone. As to the making of a fortune, if by this is meant the securing of a competence after an honest, industrious business life, agriculture holds out inducements generally, when intelligently pursued, equal at least to those of commerce or the professions. It may be a somewhat slower way of making money, and devoid of the few dazzling prizes belonging to the lottery of trade, but its gains, if smaller and slower, are in the long run surer. I have a strong misgiving that our modern systems of education, vastly improved and enlarged as they have been of late, are yet in some important things much wanting; and that they indispose our youth to enter with hearty good will on those particular pursuits which necessarily involve the performance of manual labor—pursuits, we should remember, that constitute the very foundation and framework of society. Now, this pernicious objection can only be removed by enlightening public opinion and reforming educational systems, so that youth will be taught, not merely in theory, but in practice also, to comprehend



and appreciate the worth and dignity of labor, whether of the head or hands, or, what should always be the case, of both conjoined. I cannot regard our position as farmers to be hopeless, as the fact is truly encouraging that every improvement made in agricultural mechanics—and such improvements in this mechanical age are great and rapid—as this and similar exhibitions testify, necessarily tends to diminish the severity and monotony of manual labor. Ploughing, for example, with our modern and improved implements, is quite a different thing from what it was with the heavy and ill-constructed ones of thirty or forty years ago; and the threshing, reaping and mowing machines, in the perfection to which they have already been brought, reduce human labor, as it were, to a minimum, and in great measure relieve the husbandman of some of the hitherto most laborious of his operations.

The agricultural world seems certainly, if not rapidly, adopting a new power in the cultivation of the soil, and for diminishing manual and animal labor, that will form a new and striking epoch in the history of the art. I refer to the application of steam to farm work. The steam plough has already obtained a firm footing in the British Islands, and several European countries,

in Egypt and India, in Australia and New Zealand. From what I saw last year of its working both in England and Scotland, and the severe and extensive trials to which it was subjected at the Royal Show at Leicester, the few misgivings I might have had relative to its practical and extensive adaptation were certainly removed. Not only is steam culture cheaper than horse, but it can be made deeper and more thorough than it is possible to do by the ordinary methods. It has been said that the age of the plough, the old characteristic symbol of husbandry, is gradually drawing to a close, and that this ancient implement will be superseded by the cultivator or grubber. Without endorsing this opinion in its entirety, there is no doubt some reason in its favor. For many purposes, and in particular conditions of the soil, the action of the grubber is far more advantageous than that of the plough, as a more perfect disintegration and commingling of the whole mass is thereby effected; and there seems a growing tendency in an advancing agriculture to produce this thoroughly breaking up and mixing the soil in preference to the simply turning of it over, as is done in ordinary ploughing. There is, besides, an increasing conviction among those that have adopted steam cultivation

that better crops are thereby produced; and from the opportunities I have had for observation on this matter, I am constrained to agree with the conclusion. I could not help remarking last summer on the farms of the Messrs. Howard, of Bedford, the renowned agricultural implement makers, as also in other parts of England, that the growing crops appeared more luxuriant and promising where steam culture had been adopted, all other conditions, soil, manure, &c., being apparently equal, than when, sometimes in the same field, what was considered good horse-power cultivation had been practiced. The difference in favor of the former was explained by the facts, that steam power effects a deeper, more thorough and uniform moving and intermixing of the soil, without subjecting it to the tramping of horses, which in wet weather and on heavy land, every practical man knows is very detrimental. The steam plough has, as yet, been only introduced for experimental purposes, I believe, in this country. Various causes have combined hitherto to prevent its general introduction.

Notwithstanding, I feel it is a moral certainty that on this continent, particularly on the immense prairies of the great West, the steam plough will one day achieve its proudest triumphs.

The richest soils, after the exhaustive cropping to which they are commonly subjected, will require deeper and more perfect cultivation in order to sustain their wonted fertility, and there can, I think, be little doubt that in, it may be a few years, these improved modern appliances will renovate many of your already deteriorated soils, and impart a fresh impetus and give a new and much improved character to American agriculture.

In a new and extensive country, possessing various degrees of natural fertility, where the price of labor is high, and that of produce comparatively low, the farmer is strongly tempted to adopt a system of tillage that will surely, although at first almost imperceptibly, diminish the productive power of the soil. This gradual deterioration is sometimes allowed to proceed to such an extent that cultivation ceases to be profitable, and the land may be abandoned and revert back to its original wild condition. In an immense continent like this of North America, where there are yet many millions of acres of untouched virgin soil of great natural productiveness, it would be unreasonable to expect the adoption of systems of culture which have long been profitably practiced in the older, smaller, and

more populous countries of the Eastern hemisphere. Still it must be obvious, on a little reflection, that even in America some limit will have to be put to the operation of this principle of deterioration, or the period will be reached when farming will cease to be remunerative, or the land to yield sufficient food to meet the growing wants of a rapidly increasing population. The great problem to be solved by the American farmer is how best to sustain the equilibrium between waste and supply. Every crop he raises abstracts from the soil a certain amount of mineral ingredients, constituting the essential food of plants. If this waste be suffered to go on without repair, the ultimate result will surely be sooner or later reached, the exhaustion of the soil; or, in other words, a soil so weakened by over-cropping and non-manuring that its cultivation ceases to be profitable. Amidst the too general tendency of diminished productiveness, it is encouraging to be assured that in most instances exhaustion of the soil is *relative* rather than absolute. A farm *absolutely* exhausted, that is, the tillable soil deprived of all, or nearly all, the ingredients necessary to feed healthy crops, would, in a country where land is plentiful and cheap, be dear as a gift, unless it possessed some

intrinsic value arising from situation, or other local circumstances. It is commonly found that what is termed exhausted, or worn out land, is only in that condition a few inches deep, such soils having usually been cultivated in a shallow, and imperfect manner; and below the four or five inches to which the plough has penetrated, there is frequently locked up a considerable store of plant-food. In such cases deeper cultivation, and a more intimate mixing of the soil will sometimes, without extra appliances, restore its lost fertility. Cultivation, of course, does not create matter, but simply changes its mechanical and chemical condition. It frequently happens that soils considered infertile contain a sufficient amount of plant-food in a dormant state, and all that is required to bring it into a condition to enter into the circulation of growing crops is to admit freely air, warmth and moisture by means of deeper cultivation.

There are, however, too many instances of land being worn out by over-cropping, that deeper tillage *alone* will not be found sufficient, but extra substances must be applied to the soil before its lost productiveness can be restored, hence the necessity and value of what are termed manures. It is in this department of husbandry



that modern chemistry has rendered the greatest service, not merely by analyzing the products yielded by the decomposition of plants, and therefore defining the nature and relative amounts of the various constituents of their food, but also by so treating a number of substances which otherwise would remain useless, or positively injurious, as to work them up into special manures adapted to the requirements of particular crops. In Europe the manufacture of artificial manures, as they are termed, has for some time assumed gigantic proportions; and it is encouraging to find that in several of the larger cities of this Continent, similar manufactures have already made a successful commencement. Many English farmers annually expend as much money in purchasing artificial manures and cattle food, as the amounts of their respective rents. This, with a thorough and clean system of cultivation, will account for their high *average* produce; fifty or sixty bushels of wheat per acre being now grown on land which a quarter of a century ago only produced twenty-five or thirty. We sometimes read with feelings bordering on incredulity, of the enormously large crops raised under the system designated "*high farming*;" but there can be no doubt that in a country like England, an ex-

penditure that appears to us enormous, if not utopian, is, when directed by sound judgment and experience, productive of a maximum profit. It has been said "that the soil is always grateful, but it will have something to be grateful for." Tenant-farmers in Britain may generally be said to have a working capital of from eight to ten pounds sterling per acre, the amount depending greatly on the system pursued. I was told last year, by an English tenant-farmer pursuing the mixed husbandry, that he had sixteen pounds an acre, and he felt confident that his business could be made more profitable by increasing his capital. Yet, even in England, one constantly hears the complaint that too little capital is invested in the management of land, and practical men generally endorse the sentiment. Certainly on this side the Atlantic our farming capital generally is miserably deficient, and farmers, as a rule, could make no investment of their savings so safe and profitable, as to use them for the further development of their own freeholds.

We must be careful, however, in drawing practical conclusions from analogical reasoning founded on the conditions and practices of British agriculture, as applying to our own, under different circumstances. What might pay well to do

in England, might, if attempted in the same manner, entail an actual loss in this country. True, the *principles* of agriculture are the same all over the world, but it requires both caution and local experience in properly modifying their application to meet the varying conditions of soil, climate, and markets. In old populous countries, where land is high in price and in constant demand, it may pay well to incur a very heavy expenditure in restoring absolutely exhausted farms; but in America, where land is plentiful and cheap, and the appliances for restoring a lost fertility, scarce and dear the operation would likely prove a heavy loss, the market value of the improvements falling below their cost.

There is an old adage of a very wide application, which comprises the case under consideration: "An ounce of prevention is worth a pound of cure." It is certainly much cheaper, and in some respects even easier, to keep the soil in good heart, when we have it in that condition, than to suffer its productiveness to decline, and restore it afterwards. This, no doubt, would be the practical sentiment of farmers generally, if they took a broad and prospective view of the case, and felt a *permanent* interest in the land. But it has been too much the fashion to look too ex-

clusively for *immediate* results, and to adopt a system of management which, while it enriched the fathers, must inevitably impoverish the sons. The vast fertile and unoccupied areas of the West, yielding for a while bountiful crops with little care and expenditure, have, doubtless, tended to retard the healthy development of agriculture in the Eastern and Central States, and this cause will continue to be felt, more or less, till that immense region,—of the extent and resources of which we are beginning now to form some definite conception,—becomes peopled with an industrious and thriving population. When that period shall have arrived, and the progress is assuming immense rapidity and proportions, the motives to exhaust land here, remove and commence a similar operation on new and fertile soils there, will be reduced to a minimum, and American agriculture, as a whole, will assume a high and homogeneous character, ultimately working out for itself a position, whether for magnitude or excellence, that will be unsurpassed by any portion of the habitable world.

From a pretty intimate acquaintance which I may be supposed to have of Canadian agriculture, which in its leading features must resemble, more or less, that of these Northern States, there

are a few important points on which I am accustomed to insist, and which may not be devoid of some interest and relevancy on this side of the lines. I say to our people, *cultivate less, and cultivate better*. It is the slovenly and superficial culture, so widely practiced, that keeps the average of our crops so low. Really, when we consider how little the soil receives, and how much is taken from it, the wonder is, not that it produces so little per acre, but that it grows so much. I feel morally certain that much of the land in the old world, if it received no better treatment than we are accustomed to give ours, would be inferior in production even to our own. Cultivating less, does not necessarily imply growing less. Every practical man knows full well that one acre of land properly prepared for a given crop, will produce as much as double the quantity imperfectly and negligently prepared. If, therefore, by adopting an improved system of husbandry suited to our specific wants, we can produce as much grain, roots, etc., from a less surface, the remainder can be made profitable in another way, that is, in pasture, whereby we give the land "rest," and enable it to sustain a larger number of live stock. Between "corn and horn," to use an old phrase, there is an inti-

mate connection and a mutual dependence. By keeping more stock of improved and suitable breeds, we get larger and quicker money returns, make more manure, which is the farmer's sheet anchor, after he has diminished the often great natural fertility of his virgin soil.

I can see no other method, alike practicable and profitable, of restoring and sustaining the fertility of the soil. As the population of the country increases, particularly in the great centres of manufacturing and commercial industry, the demand for food of improved quality proportionately increases. Prices advance for grain and meat, and a fresh impetus is given to both departments. The more cattle and sheep the farmer keeps, the more grain he grows, as animals are the manufacturers of manure, that is, the food of crops. And here let us pause a moment, and reflect on the lamentable waste of productive power, arising from the most culpable neglect of the precious article of farm-yard manure. I don't exactly know how this matter stands with you on this side the boundary, but I never meet a body of our farmers without reminding them of the fact, that from unnecessary exposure, barn-yard manure is frequently reduced in value forty or fifty per cent; a loss that might



generally be prevented by the exercise of a little forethought and care, involving no heavy pecuniary expenditure. In old-settled sections such waste is unpardonable, and would be considered inhuman, if plants were regarded as possessing a sensitive organization. I can remember when this kind of manure was similarly neglected in the more backward districts of England, and felt puzzled to determine which inflicted the greater evil on his country, the tenant-farmer who neglected his manure to develop his crops, or the game-preserving landlord, who caused them to be eaten up. The possession of land is a sacred trust, and society sanctions by law the right of private ownership on the understood condition that it be used in such a manner as to confer the greatest benefit, not merely on the individual owner or occupier, but on the community at large.

Among the most efficient means of agricultural improvement in the temperate zone, at least, is Draining, an artifice that has been attended by the most beneficial results, particularly on wet and heavy soils. I will say a few words both of caution and encouragement on this subject. I have found newly arrived settlers in the newer parts of Canada, who had been accustomed to the

use of draining tools, quite cast down in spirits, because they found themselves unable to carry out in practice the refined, elaborate, and expensive systems of draining to which they had been accustomed in the parent country. The difficulty in some instances of getting a sufficient outfall, and no draining tools, or pipes being accessible, the operation was looked upon with feelings bordering on despair. I have spoken words of encouragement to such people, and shown them how they might make a commencement, at least, with success. In a new country especially, we must be guided in the character and extent of our operations by the main physical conditions of the surface ; in other words, aid and improve nature's drainage. The clearing out of streams and creeks where they are obstructed by mud, fallen trees, and aquatic plants, is the first lesson to learn in practical draining. In this way an outfall can be generally obtained ; but in very level districts to accomplish this primary and essential object, the co-operation of several owners of land, through considerable distances, is sometimes necessary. Few can fully understand, apart from personal experience or observation, what an advantage it is to improve the natural water channels of a wet and level district. This

preliminary being accomplished, the making of open or covered drains, as circumstances require, may be advantageously proceeded with. In the older cultivated districts of this country the more thorough and refined British systems of draining may be profitably followed, subjected to such modifications as differences in soil and climate naturally suggest. In a new country, however, draining must be, as a rule, differently commenced and executed, to what can be done in such as are older and wealthier. A ditch dug out as narrow at the bottom as the tool will allow, and partly filled with old rails or the boughs of trees, closely trodden down with a portion of the moved earth, will often answer an excellent purpose for several years. I observed in England last summer a few drains in a field two or three of which had not wholly lost their functions, which I assisted in making when a boy, near half a century ago. The land is in permanent pasture, exceedingly tenacious, the drains were dug three feet deep (considered in those days "deep draining"), and the width gradually diminishing to about two inches at the bottom, in which was placed heath (heather) and the soil returned thereon, closely tramped down. The durability of such draining in clay soils, when

carefully executed, and with which cultivation or wild animals do not interfere, is almost incredible. I mention these facts to encourage settlers in new districts to commence and persevere in the prosecution of such an efficient method of agricultural and sanitary improvement. The ditching plough, which has recently received important structural modifications, promises to become a very valuable implement in cheapening and extending draining processes. Before, however, dismissing this subject it is important to observe that the cheap system of draining (if what has been suggested can be so designated) is intended simply as introductory and provisional, as the best suited to the wants and circumstances of new settlers. There is no other agricultural operation that calls for the exercise of more judgment and care; and when means and appliances admit, no reasonable amount of expense should be spared in making the work as effective and permanent as possible.

I cannot conclude without again very briefly adverting to the immense progress made of late years by the exhibitions of this Society, and the improvements in agriculture and other industrial arts that must have resulted therefrom. From a humble commencement, not much more, I be-

lieve, than a quarter of a century ago, the course of this Society has been constantly onward, and its influence for good has been widely felt, not only in this and neighboring States, but throughout the Union and the Dominion of Canada. Indeed its fame has extended to every country of the civilized world. Its contributions to our common agricultural literature, the researches it has instituted into the nature and treatment of new and mysterious forms of disease of a most malignant character among the domesticated animals, and the thorough, systematic trials of farm implements and machines which it has on several public occasions made, impart to your Society a very high character for energy and usefulness.

What a magnificent theatre does this great country present for the working out of the enlightenment, freedom and happiness of our common humanity? Extending east and west from one ocean to another, and from the great lakes in the north to the gulf of Mexico in the south, comprising almost every climate, traversed by rivers of unrivaled magnitude, and richly endowed by nature with the means of agricultural, manufacturing and mineral wealth, it offers homes of plenty and comfort to the many thousands of

the sons of toil who annually land upon its shores. I well remember, now more than half a century ago, a mechanic with his family emigrating from my little picturesque native village in the south of England, to the western portion of the State of Illinois, which at that day was regarded as the "far west." It took him more time and trouble to get from New York to his destination than the whole ocean voyage, which at that period was a much more formidable undertaking than it is now. How stupendous the changes in the means of locomotion, as in many other things since then, supplied by the steamboat and the railroad, the latter now connecting the Atlantic with the Pacific! These are truly marvelous changes occurring within living memory, and their benefits, with yet still further developments, will be transmitted from sire to son, through all future generations.

It is now upwards of twenty years since I first had the pleasure of attending the New York State Agricultural Show, and I have observed with much gratification and benefit the astonishing progress you have made. Many of the earlier members of this Society, who took a prominent part in its management, among whom I had the honor of including several esteemed personal

friends, have been removed from this earthly scene. And I cannot allow the present opportunity to pass, without expressing my deepest sympathy with the members of this Society, for the recent loss of its late venerable, respected, and most efficient Secretary. Col. JOHNSON was no ordinary man, and he was known and esteemed far beyond the Society, which he so long and honorably served. He certainly had a *British*, if not a European reputation, and we, over in Canada, were accustomed to look upon him as one of ourselves. In common with you, we mourn his loss; many of his acts of kindly and courteous attention will be long and gratefully remembered by not a few of the members of our "Provincial Association;" and now, that so good and true a man, full of years and honors, has been taken from us by the relentless hand of death, all I will further say is, what I am sure will honestly express the most sacred feelings of all your hearts: "*Requiescat in pace.*"

Only another word, and I have done. We meet on this occasion to promote the arts of peace and good will, the wealth, intelligence and happiness of Nations. As a British Canadian, I wish to express to you, and through you to the citizens of the United States generally, the cor-



dial feeling of my people on the other side of the Lakes, not only towards this Society, but for the peace and prosperity of your common country. We live, it is true, under different forms of government, but we speak a common language, and are proud of a common ancestry; and in fact we have so much in common that we regard as good and permanent, as will, I most devoutly trust, under the guidance and blessing of Divine Providence, lead to earnest and harmonious action in promoting the material development of our respective soils, and the peace, liberty, and happiness of the toiling millions of this vast Continent.













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